**IN THE CLAIMS:**

1. (Original) A multilayer system for the extreme ultraviolet wavelength range comprising:
alternating layers of materials with different refractive indices or absorption coefficients, and a protective layer system having different material than said alternating layers and being disposed on top of said alternating layers, wherein the protective layer system is a) iridium, carbon covered by iridium, molybdenum carbide covered by iridium, aluminium oxide covered by iridium, titanium nitride covered by iridium, or titanium dioxide covered by iridium, or b) a mixture, an alloy or a compound of iridium and a further substance, or c) a mixture of silicon nitride and a further substance.

2. (Original) A multilayer system for the extreme ultraviolet wavelength range comprising:
alternating layers of a) molybdenum and silicon or b) molybdenum and beryllium, and a protective layer system disposed on said alternating layers, wherein the protective layer systems is a) iridium, carbon covered by iridium; molybdenum carbide covered by iridium; aluminium oxide covered by iridium; titanium nitride covered by iridium; titanium dioxide covered by iridium; a mixture, an alloy or a compound of iridium and a further substance, or b) a mixture of silicon nitride and a further substance.

3. (Original) A multilayer system for the extreme ultraviolet wavelength range comprising:
alternating layers of materials with different refractive indices or absorption coefficients with a protective layer system, wherein the protective layer system consists of at least iridium.

4. (Original) A multilayer system for the extreme ultraviolet wavelength range comprising alternating layers of materials with different refractive indices or absorption coefficients, wherein at least one interface of two alternating layers shows implanted carbon.

5. (Original) A method for the production of a multilayer system for the extreme ultraviolet wavelength range, made from alternating layers of materials with different refractive indices or absorption coefficients with a protective layer system, comprising one or several layers, comprising the steps of:

directly applying the protective layer system to the outermost layer of the multilayer system, and

producing some or all of the protective layers using ion beam treatment during their fabrication.

6. (Original) A method according to claim 5, wherein one or more inert gases are used for the ion beam.

7. (Original) A method according to claim 5, wherein an ion beam containing Ar, Kr, Ne, He, hydrogen, oxygen, carbon or nitrogen is used.

8. (Original) A method according to claim 5, wherein an ion beam containing a mixture of an inert gas and $CH_4$ is used.

9. (Original) A method according to claim 5, wherein the protective layer system consists of carbon, ruthenium, iridium, rhodium, silicon carbide, silicon nitride, titanium nitride, titanium dioxide or aluminium oxide.

10. (Currently Amended) A method according to claim ~~56~~ 5, wherein the protective layer system comprises carbon, ruthenium, iridium, rhodium, silicon carbide, silicon nitride, titanium nitride, titanium dioxide or aluminium oxide.

11. (Original) A method according to claim 5, wherein the protective layer material is deposited of atomic thickness and that then the material is converted to a state of oxide or nitride or carbide by applying low-energy oxygen or nitrogen or carbon ions.

12. (Original) A method for the production of a multilayer system for the extreme ultraviolet wavelength range, made from alternating layers of materials with different refractive indices or absorption coefficients with a protective layer system, comprising one or several layers, comprising the steps of:
directly applying the protective layer system comprising at least one carbon layer to the outermost layer of the multilayer system, and producing at least the carbon layer using ion beam treatment during their fabrication.

13. (Original) A method according to claim 12, wherein after deposition the protective carbon layer is exposed at least to EUV radiation, to electron beam, or to elevated temperatures.

14. (Original) A method according to claim 13, wherein the exposures are done in the environment of gases containing oxygen.

15. (Original) A method for the production of a multilayer system, made from alternating layers of different refractive indices or absorption coefficients and at least one barrier layer between at least two alternating layers, comprising the step of: producing at least the barrier layer by physical vapour deposition with ion beam treatment.

16. (Original) A method for the production of a multilayer system, made from alternating layers of different refractive indices or absorption coefficients and at least one barrier layer between at least two alternating layers and a protection layer system, comprising one or several layers, comprising the step of: producing at least the barrier layer by physical vapour deposition with ion beam treatment.

17. (Original) Method as claimed in claim 15 , wherein the ion beam is generated by an ion source using nitrogen or a mixture of nitrogen and an inert gas or a mixture of $CH_4$ and an inert gas or a mixture of hydrogen and an inert gas.

18. (Original) Method as claimed in claim 16, wherein the ion beam is generated by an ion source using nitrogen or a mixture of nitrogen and an inert gas or a mixture of $CH_4$ and an inert gas or a mixture of hydrogen and an inert gas.

19. (Original) Method as claimed in claims 15, wherein at least one of the alternating layers is deposited with ion beam assistance at least for starting and/or terminating the respective material's deposition.

20. (Original) Method as claimed in claims 16, wherein at least one of the alternating layers is deposited with ion beam assistance at least for starting and/or terminating the respective material's deposition.

21. (Original) Method as claimed in claims 15, wherein the energy of the ions is in the range of about 5eV to 1500 eV.

22. (Original) Method as claimed in claims 16, wherein the energy of the ions is in the range of about 5eV to 1500 eV.

23. (Original) Method as claimed in claims 15, wherein the alternating layers are made from molybdenum and silicon.

24. (Original) Method as claimed in claims 16, wherein the alternating layers are made from molybdenum and silicon.

25. (Original) Method for the production of a multilayer system. made from alternating layers of different refractive indices or absorption coefficients, comprising the step of: exposing at least one of the alternating layers after its deposit on to an ion beam generated by an ion source using nitrogen or a mixture of nitrogen and an inert gas or a mixture of $CH_4$ and an inert gas or a mixture of hydrogen and an inert gas.

26. (Original) Method as claimed in claim 25, wherein the energy of the ions is in the range of about 10 eV to 1.5 keV.

27. (Original) Method as claimed in claim 25, wherein the alternating layers are made from molybdenum and silicon.

28. (Original) Method as claimed in claim 26, wherein the alternating layers are made from molybdenum and silicon.